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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/695,763	10/30/2003	Takayuki Ochiai	2003-1556A	6908

513 7590 09/16/2005

WENDEROTH, LIND & PONACK, L.L.P.
2033 K STREET N. W.
SUITE 800
WASHINGTON, DC 20006-1021

EXAMINER	
VAN ROY, TOD THOMAS	
ART UNIT	**PAPER NUMBER**
2828	

DATE MAILED: 09/16/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/695,763	OCHIAI ET AL.	
	Examiner	Art Unit	
	Tod T. Van Roy	2828	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *21-40* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *21-40* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *30 October 2003* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *01/30/04,12/23/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

The examiner notes that the foreign patent documents associated with the IDS dated 01/30/2004 were not included with the application and hence were not considered.

Priority

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Drawings

Figures 4a and 4b should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 21-23, and 31-33, and 36 are rejected under 35 U.S.C. 102(b) as being anticipated by Yamanaka et al. (US 5548320).

With respect to claim 21, Yamanaka discloses a semiconductor laser drive circuit for a semiconductor laser element including a semiconductor laser diode (fig.4 LD) and a monitor photodiode (fig.4 PD) both having respective cathodes connected in common, wherein the semiconductor laser diode has an anode connected to a power supply line side (fig.4 anode connected to +5v) and the monitor photodiode has an anode connected to a ground line side via a voltage generating unit (fig.4 connected to ground through voltage generating unit VR1) generating voltage according to an amount of current flowing into the monitor photodiode, the semiconductor laser drive circuit comprising: a current control element adjusting (fig.4 Q3) an amount of current supplied to the semiconductor laser diode; feedback control unit (fig.4 CT) receiving a voltage generated by the voltage generating element (fig.4 input to CT in – terminal) to supply a control signal to a control terminal of the current control element (fig.4 CO feedback to lines DA1/2, col.4 lines 40-50) based upon the relationship of a reference voltage level (fig.4 voltage through R10-12) to the voltage generated, thereby controlling feedback manner the output laser beam of the semiconductor laser diode so as to maintain the

output laser beam at a predetermined level (output can be maintained at any given level, including a predetermined point); a biasing element provided between the common cathode connection of the semiconductor laser diode and the monitor photodiode, and the ground line, (fig.4 #R6) the biasing element applying a reverse bias voltage to the monitor photodiode.

With respect to claims 22 and 23, Yamanaka discloses the current control circuit to be provided between the cathode connection of the semiconductor laser diode and the monitor photodiode, and the ground line (fig.4 Q3 in series between cathode connection and ground line).

With respect to claim 31, Yamanaka discloses a photoelectric sensor comprising a light emitting unit emitting light directed to a detection region and a light receiving unit receiving light from the detection region, thereby performing a detecting operation according to a level of the light received by the light receiving unit, the light emitting unit including a semiconductor laser drive circuit for a semiconductor laser element including a semiconductor laser diode (fig.4 LD) and a monitor photodiode (fig.4 PD) both having respective cathodes connected in common, wherein the semiconductor laser diode has an anode connected to a power supply line side (fig.4 anode connected to +5v) and the monitor photodiode has an anode connected to a ground line side via a voltage generating unit (fig.4 connected to ground through voltage generating unit VR1) generating voltage according to an amount of current flowing into the monitor photodiode, the semiconductor laser drive circuit comprising: a current control element adjusting (fig.4 Q3) an amount of current supplied to the semiconductor

laser diode; feedback control unit (fig.4 CT) receiving a voltage generated by the voltage generating element (fig.4 input to CT in – terminal) to supply a control signal to a control terminal of the current control element (fig.4 CO feedback to lines DA1/2, col.4 lines 40-50) based upon the relationship of a reference voltage level (fig.4 voltage through R10-12) to the voltage generated, thereby controlling feedback manner the output laser beam of the semiconductor laser diode so as to maintain the output laser beam at a predetermined level (output can be maintained at any given level, including a predetermined point); a biasing element provided between the common cathode connection of the semiconductor laser diode and the monitor photodiode, and the ground line, (fig.4 #R6) the biasing element applying a reverse bias voltage to the monitor photodiode.

With respect to claims 32 and 33, Yamanaka discloses the current control circuit to be provided between the cathode connection of the semiconductor laser diode and the monitor photodiode, and the ground line (fig.4 Q3 in series between cathode connection and ground line).

With respect to claim 36, Yamanaka discloses the current control element to be a bi-polar transistor (fig.4 Q3).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 24-25, 34-35, and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamanaka.

With respect to claims 24-25, and 34-35, Yamanaka teaches the laser drive circuits outlined in the rejections to claims 21 and 31 above, including the reference voltage and biasing elements to be made up of fixed value resistors, but does not teach the reference voltage or biasing elements to be made up of variable resistors. It would have been obvious to one of ordinary skill in the art at the time of the invention to replace the fixed valued resistors of Yamanaka with variable resistors, well known in the art of laser driving circuits, as this would allow for easy adjustment of the reference voltage levels, as well as additional control over the biasing levels of the diodes.

With respect to claim 37, Yamanaka teaches the laser drive circuits outlined in the rejection to claim 31 above, including the current control element to be made up of a bipolar junction transistor, but does not teach the current control element to be a field effect transistor. It would have been obvious to one of ordinary skill in the art at the time of the invention to replace the BJT of Yamanaka with a FET, well known in the art of

laser driving circuits, as this transistor would allow for any necessary switching operations while drawing much less power from the input signal in comparison to the BJT.

Claims 21, 26-30, 31, and 38-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cantatore et al. (US 5936986) in view of Yamanaka.

With respect to claim 21, Cantatore teaches a semiconductor laser drive circuit for a semiconductor laser element including a semiconductor laser diode (fig.21 right side of laser diode box) and a monitor photodiode (fig.21 left side of laser diode box) both having respective cathodes connected in common, wherein the semiconductor laser diode has an anode connected to a power supply line side (fig.21 anode connected to -5v) and the monitor photodiode has an anode connected to a ground line side via a voltage generating unit (fig.21 connected to ground through voltage generating unit #446) generating voltage according to an amount of current flowing into the monitor photodiode, the semiconductor laser drive circuit comprising: a current control element adjusting (fig.21 #442) an amount of current supplied to the semiconductor laser diode; feedback control unit (fig.21 #441) receiving a voltage generated by the voltage generating element (fig.21 input to #441 in – terminal) to supply a control signal to a control terminal of the current control element (fig.21 #441 output to #442) based upon the relationship of a reference voltage level (fig.21 voltage through #444) to the voltage generated, thereby controlling feedback manner the output laser beam of the semiconductor laser diode so as to maintain the output laser beam at

a predetermined level (output can be maintained at any given level, including a predetermined point). Cantatore does not teach a biasing element provided between the common cathode connection of the semiconductor laser diode and the monitor photodiode, and the ground line, the biasing element applying a reverse bias voltage to the monitor photodiode. Yamanaka teaches a laser driving circuit that includes a biasing element between the common cathode connection and the ground line (fig.4 R6). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the laser driver of Cantatore with the biasing element of Yamanaka to add an additional degree of bias level control to the laser and photo diodes.

With respect to claim 26, Cantatore and Yamanaka teach the laser driving circuit as outlined in the rejection to claim 21, and Cantatore further teaches the current control circuit to be provided between the power supply line and the anode of the laser diode (as seen in fig.21).

With respect to claims 27 and 28, Cantatore and Yamanaka teach the laser drive circuit outlined in the rejection to claim 26 above, including the reference voltage and biasing elements to be made up of fixed value resistors, but does not teach the reference voltage or biasing elements to be made up of variable resistors. It would have been obvious to one of ordinary skill in the art at the time of the invention to replace the fixed valued resistors of Cantatore and Yamanaka with variable resistors, well known in the art of laser driving circuits, as this would allow for easy adjustment of the reference voltage levels, as well as additional control over the biasing levels of the diodes.

With respect to claim 29, Cantatore and Yamanaka teach the laser driving circuit as outlined in the rejection to claim 26, and Cantatore further teaches the current control element to be a bi-polar transistor (fig.21 #442).

With respect to claim 30, Cantatore and Yamanaka teach the laser drive circuit outlined in the rejection to claim 26, including the current control element to be made up of a bipolar junction transistor, but do not teach the current control element to be a field effect transistor. It would have been obvious to one of ordinary skill in the art at the time of the invention to replace the BJT of Cantatore and Yamanaka with a FET, well known in the art of laser driving circuits, as this transistor would allow for any necessary switching operations while drawing much less power from the input signal in comparison to the BJT.

With respect to claim 31, Cantatore discloses a photoelectric sensor comprising a light emitting unit emitting light directed to a detection region and a light receiving unit receiving light from the detection region, thereby performing a detecting operation according to a level of the light received by the light receiving unit, the light emitting unit including a semiconductor laser drive circuit for a semiconductor laser element including a semiconductor laser diode (fig.21 right side of laser diode box) and a monitor photodiode (fig.21 left side of laser diode box) both having respective cathodes connected in common, wherein the semiconductor laser diode has an anode connected to a power supply line side (fig.21 anode connected to -5v) and the monitor photodiode has an anode connected to a ground line side via a voltage generating unit (fig.21 connected to ground through voltage generating unit #446) generating voltage

according to an amount of current flowing into the monitor photodiode, the semiconductor laser drive circuit comprising: a current control element adjusting (fig.21 #442) an amount of current supplied to the semiconductor laser diode; feedback control unit (fig.21 #441) receiving a voltage generated by the voltage generating element (fig.21 input to #441 in – terminal) to supply a control signal to a control terminal of the current control element (fig.21 #441 output to #442) based upon the relationship of a reference voltage level (fig.21 voltage through #444) to the voltage generated, thereby controlling feedback manner the output laser beam of the semiconductor laser diode so as to maintain the output laser beam at a predetermined level (output can be maintained at any given level, including a predetermined point). Cantatore does not teach a biasing element provided between the common cathode connection of the semiconductor laser diode and the monitor photodiode, and the ground line, the biasing element applying a reverse bias voltage to the monitor photodiode. Yamanaka teaches a laser driving circuit that includes a biasing element between the common cathode connection and the ground line (fig.4 R6). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the laser driver of Cantatore with the biasing element of Yamanaka to add an additional degree of bias level control to the laser and photo diodes.

With respect to claim 38, Cantatore and Yamanaka teach the laser driving circuit as outlined in the rejection to claim 31, and Cantatore further teaches the current control circuit to be provided between the power supply line and the anode of the laser diode (as seen in fig.21).

With respect to claims 39 and 40, Cantatore and Yamanaka teach the laser drive circuit outlined in the rejection to claim 38 above, including the reference voltage and biasing elements to be made up of fixed value resistors, but does not teach the reference voltage or biasing elements to be made up of variable resistors. It would have been obvious to one of ordinary skill in the art at the time of the invention to replace the fixed valued resistors of Cantatore and Yamanaka with variable resistors, well known in the art of laser driving circuits, as this would allow for easy adjustment of the reference voltage levels, as well as additional control over the biasing levels of the diodes.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tod T. Van Roy whose telephone number is (571)272-8447. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Minsun Harvey can be reached on (571)272-1835. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

TVR

MINSUN OH HARVEY
PRIMARY EXAMINER